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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/501,791

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Yoshifumi Kachi

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JAPAN

EXAMINER

CHANDRA, SATISH

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

08/14/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/501,791	Applicant(s) KACHI ET AL.	
	Examiner SATISH CHANDRA	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>7/04, 12/05, 4/08</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 - 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuibira et al (Patent No. 2002/0007911) in view of Ferguson (US 2003/0209534) and Aonuma et al (Patent No. JP02002252269).

Kuibira et al discloses:

Regarding claim 1, a wafer holder (susceptor) 1 (Fig 5) containing at least one heater 11.

The cross sectional shape 11 (Fig 3) is shown as a rectangular whose lateral and bottom sides perpendicular to each other and having an angle of 90 degrees.

Kuibira et al further discloses: according to the manufacturing method of the present invention, by reviewing conditions of applying paste by printing that contains metal particles, the conductive layer can be formed to have the linear pattern with the line width and the line interval each of 5 mm or less (Para 0028, 0044 and 0075).

Regarding claims 2, 3, the temperature distribution of the wafer in a film deposition process should be within 1% (Para 0028) when the line width and the line interval of the linear pattern of the conductive layer (Para 0028, 0044 and 0075) are

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each 5 mm or less. And in order to achieve a temperature distribution within 0.5%, the line width and the line interval of the linear pattern of the conductive layer should be 1 mm or less (Para 0028).

Regarding claims 4, 8 and 9, any one of aluminum nitride, aluminum oxide, silicon nitride and aluminum oxynitride (Para 0029) as base material for the wafer holder.

Regarding claims 5 and 10, the use of aluminum nitride for ceramic substrate having a high thermal conductivity of at least 100 W/m K (Para 0030).

Regarding claims 6, 11, using at least one metal from the group tungsten, molybdenum, silver, palladium, platinum, nickel or chromium (Para 0031) for forming the conductive layer.

Regarding claim 7, 12-14, using plasma electrode 12 (Figs 1, 5) as a conductive layer (Para 0071, 0077 and 0085).

Kuibira et al does not disclose:

Regarding claim 1, conductive paste of viscosity selected so that as print-coated, the wiring lines take on a substantially trapezoidal form in cross-section.

Ferguson discloses:

Regarding claim 1, most conductive paste and inks contain many volatile solvents and other environmentally undesirable constituents that are used to adjust the rheology of the paste (Para 0012) wherein conductive pastes and inks are frequently used for resistive heating applications.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the rheology of the conductive paste (viscosity of the paste) for forming a desired pattern in the apparatus of Kuibira et al as taught by Ferguson. It would have obvious to a skilled artisan to combine the prior art elements to yield predictable results such as adjusting the rheology of the conductive paste (viscosity of the paste) for forming a desired pattern in the apparatus of Kuibira et al as taught by Ferguson.

It would also have been obvious to one of ordinary skill in the art at the time of invention to make a conductive paste of viscosity selected to form a pattern of desired shape including trapezoidal shape in the apparatus of Kuibira et al and Ferguson.

The motivation for adjusting the rheology of the conductive paste (viscosity of the paste) for forming a desired pattern in the apparatus of Kuibira et al is to form desired patterns of heating elements in the apparatus of Kuibira et al and Ferguson.

The motivation to provide a trapezoidal shaped heating element having inclined edges is to provide an alternate and equivalent heating element in the apparatus of Kuibira et al and Ferguson. Further, it was held in *re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).

Kuibira et al and Ferguson do not disclose:

The desired pattern of wiring lines is substantially in the shape of a trapezoid.

Aonuma et al discloses:

Regarding claim 1, a susceptor including a heating element 12 (Fig 2) embedded therein. The resistive heating element may be oval, capsular or rectangular and is not limited in its cross-sectional shape (Para 0024).

Therefore it would have been obvious to one of ordinary skill in the art to provide resistive heating elements of any shape including trapezoidal having inclined edges in the apparatus of Kuibira et al and Ferguson as taught by Aonuma et al. It would have been obvious to a skilled artisan to combine prior art elements to yield predictable results such as providing resistive heating elements of any shape including trapezoidal having inclined edges in the apparatus of Kuibira et al and Ferguson as taught by Aonuma et al.

The motivation to provide a trapezoidal shaped heating element having inclined edges is to provide an alternate and equivalent heating element as taught by Aonuma et al. Further, it was held in *re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).

Response to Arguments

Applicant's arguments filed 5/19/2008 have been fully considered but they are not persuasive.

Regarding the arguments:

Claim Rejections - 35 U.S.C. § 103
2. Claims 1-14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kuibira et al. (U.S. Pat. No. 6,508,884) in view of Ferguson (U.S. Pat. App. Pub. No. 2003/0209534) and Aonuma et al. (Japanese Unexamined Pat. App. Pub. No. 2002-252269).
Applicability of Kuibira et al. as a ,~ 103 Reference

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3. In making this rejection, with regard to the applicability of Kuibira et al. '884--that is, the U.S. patent itself as a reference--the Examiner has again maintained,

[B]ased upon the earlier effective U.S. filing date of the reference [Kuibira et al.], it constitutes prior art only under 35 U.S.C. 102(e) This rejection might... be overcome by showing that the reference is disqualified under 35 U.S.C. § 103(c) as prior art in a rejection under 35 U.S.C. § 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

4. Applicant's undersigned representative now realizes that his remarks in the September 10, 2007 reply concerning the applicability of Kuibira et al. improperly presumed that the Office's having cited Kuibira et al. the issued patent (No. 6,508,884) is tantamount to the Office's also citing Kuibira et al. the published patent application (Pub. No. 2002/0007911). At the same time, Applicants' undersigned representative also failed to consider that the filing date of the present application is, for legal purposes in considering the applicability of a reference, not the July 2, 2004 § 371(c) date on which the present application was entered into the U.S. National Stage, but is, rather, its March 20, 2003 International filing date. 5. Hence, the Office's statement that Kuibira et al. '884 "constitutes prior art only under 35 U.S.C. § 102(e)" is now properly understood to be--and understood to be proper--because although the January 21, 2003 issue date of Kuibira et al. '884 does not predate the March 20, 2003 filing date of the instant application by more than a year (such as would make Kuibira et al. '884 applicable as a § 102(a)

or § 102(b) reference), the dates are so close as to lead to the presumption that Kuibira et al. '884 was filed in the U.S. before the invention in the instant application was completed.

6. Reconsideration of the presently addressed rejection--which is the lone rejection outstanding in the prosecution of this application--under 35 U.S.C. § 103(a) over Kuibira et al. '884 as a primary reference is requested in view of the telephone interview conducted on May 16, 2006 with Primary Examiner Jeffrie Lund, by Applicant's undersigned representative. Accordingly, on Applicant's behalf the following summary is submitted, further to the interview summary to be provided by Examiner Lund.

The Examiner agrees with the applicant and the Kuibira et al (US 6,508,884) has been replaced with Kuibira et al (US publication 2002/0007911) to get a publication date of January 24, 2002. The applicant should note that this reference of Kuibira et al (US 2002/0007911) is still the same reference as that of previously cited Kuibira et al reference (US 6,508,884) and is available under 102 a and e for rejection of the claims.

Regarding the arguments:

Applicability of Ferguson as a § 103 Reference

Ferguson, which was published on November 13, 2003, is apparently presumed to qualify as a reference under § 102(e) not on the basis of its May 9, 2003 filing date as a non-provisional application, which postdates the above-noted March 20, 2003 International filing date of the present application, but on the basis of its May 9, 2002 filing date as a provisional application--the Office's presumption being (according to MPEP 2136.03) that the Ferguson provisional application properly supports the subject matter relied upon to make the rejection in compliance with 35 U.S.C. § 112, first paragraph.

The Ferguson reference, available on the basis of provisional application of May 9, 2002, supports the subject matter relied on in making the rejection of claim 1.

Regarding the arguments:

§ 103 Rejection Addressed Substantively

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9. Applicant respectfully submits that even if Kuibira et al. becomes applicable as a § 103(a) reference in its earlier incarnation as U.S. Pat. App. Pub. No. 2002/0007911, either alone or in the cited combination the reference does not teach or suggest the present invention. In particular, Applicant's counterarguments with regard to Kuibira et al. and Aonuma et al. are as below.

10. The Kuibira et al. reference, in which the angle formed by the bottom and lateral sides is 90°, is cited to begin with; yet Kuibira et al. merely sets forth a conductive layer schematically, in an idealized rectangular form; in fact, when manufacture of the layer by printing is carried out, viscosity is imparted to the paste, and, owing to gravity and to conditions during printing, creeping occurs, such that the layer turns out to be trapezoidal in cross sectional form, as described in the present application.

11. With the present application, from investigations focusing attention on this particularized angle, it became apparent that though a maximal 90° angle cannot be achieved in reality, if the minimal angle of the trapezoidal form is less than 5°,

serious cracking occurs, which led to finding the lower limit of the trapezoidal form's minimal angle.

12. That is, it was found that if the best-suited trapezoidal minimal angle in cross-sectional form is 5° or more, shorting between adjacent circuit lines, in the areas where acute angles have formed due to the creeping portions, does not arise, which enables high-reliability ceramic susceptors to be obtained.

13. In the present application, the conductive layer is manufactured by varying the paste dilution to alter the paste viscosity (page 6, line 7 & ft. of the specification as filed) so that the minimal angle will be 5° or more, whereas Kuibira et al. is silent as to especially adjusting the paste in the manner of the present application, and in fact is unclear as to whether the minimal angle in cross-section proving to be of trapezoidal form is 5° or more, wherein Kuibira et al. includes the possibility of the minimal angle being less than 5°, such that from the reference one could not arrive at being able to solve--as achieved in the present application--substrate damage due to shorting.

The Examiner disagrees because of the following reasons:

Though the Kuibira reference is silent about adjusting the paste viscosity, the Ferguson reference teaches adjusting the viscosity of the paste used in resistive heating applications. It is obvious that when manufacturing of the layer by printing is carried out, creeping of the paste may occur due to gravity and to the conditions during printing, leading to possibly a trapezoidal form which reads on the claimed language of claim 1. Further, the cross section shape 11 (Fig 3) of Kuibira reference shows as a rectangular shape whose lateral and bottom sides are perpendicular to each other and having an angle of 90 degrees which also reads on the claimed language of claim 1.

Therefore, it would have been obvious to a skilled artisan to adjust the rheology of the conductive paste (viscosity of the paste) for forming a desired pattern in the apparatus of Kuibira et al as taught by Ferguson.

Regarding the arguments:

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14. In the Aonuma et al. reference, a manufacturing method in which metal wire is joined into a groove processed by machining or sandblasting is disclosed, which totally differs from the printing technique in the present application. With their manufacturing method, ceramic substrates have to undergo the preparatory groove processing operation, meaning a higher-cost manufacturing method by comparison with a printing technique in the manner of the present application, such that the present invention is superior.

15. Aonuma et al. notes that there are no special restrictions on the heating element 12 in sectional form being elliptical, capsular, oblong, etc., and in the reference, processing of the metal wire is set forth, in paragraph [0020]. This means that their conductive layer is composed of metal alone; yet inasmuch as a conductive layer in the present application is a sinter of a paste, the elemental composition of the conductive layer is different.

16. Meanwhile, Aonuma et al. does present a configuration in which metal wire and a conductive paste are combined, but in that case as well, the elemental composition of the manufactured result differs completely from the present application, in which the conductive layer is made solely of a sintered paste.

17. Moreover, with the manufacturing method set forth in Aonuma et al., the structure joins metal wire into the inside of grooves, wherein the heater-wire spacing must take up considerable breadth given the groove-processing constraints; therefore, shorting of the heater wires is unlikely to arise.

18. In the present application, the downside of the paste printing technique allowing the heater-wire spacing to be made denser is that shorting therein is more liable to occur; thus with the goal of preventing this, the present invention is a result of investigating in detail in what manner the cross-sectional form should be controlled, while in Aonuma et al. there is neither any mention of nor suggestion with respect to such issues.

The Examiner again disagrees because of the following reasons:

Aonuma reference was used to show different shapes of heating elements such as oval, capsular, rectangular or any other shape. A heating element whether made of a metal wire or formed by a conductive paste is still a heating element and serves the same purpose of supplying or conducting heat. Therefore it would have obvious to a skilled artisan to combine the teachings of Aonuma with the teachings of Kuibira and Ferguson in forming a trapezoidal shape heating element. Further, it was held in *re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966) that the shape was a matter of choice which a person of ordinary skill in the art would have found obvious absent persuasive evidence that the particular shape was significant. (Also see MPEP 2144.04(d)).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Satish Chandra whose telephone number is 571-272-3769. The examiner can normally be reached on 8 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, Primary Examiner, Jeffrie R. Lund can be reached on 571-272-1437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO

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Customer Service Representative or access to the automated information system, call
800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jeffrie R. Lund/
Primary Examiner, Art Unit 1792

Satish Chandra

Jeffrie R. Lund
Primary Examiner

SC
8/14/2008